

Name: Solutions

1. Given a line containing the points $(0,5)$ and $(-1,8)$. Find an equation of the line in point-slope form. Convert your equation to slope-intercept form.

$$m = \frac{8-5}{-1-0} = \frac{3}{-1} = -3$$

$$y - 8 = -3(x - (-1))$$

$$y - 8 = -3(x + 1)$$

$$y - 8 = -3x - 3$$

$$y = -3x + 5$$

2. Given a line containing the points $(-4,-1)$ and $(12,11)$. Find the equation of the line in slope-intercept form.

$$m = \frac{11 - (-1)}{12 - (-4)} = \frac{12}{16} = \frac{3}{4}$$

$$y - 11 = \frac{3}{4}(x - 12)$$

$$y - 11 = \frac{3}{4}x - 9$$

$$y = \frac{3}{4}x + 2$$

3. Given a line containing the points $(-6,-2)$ and $(4,-7)$. Find an equation of the line in point-slope form.

$$m = \frac{-7 - (-2)}{4 - (-6)} = \frac{-5}{10} = -\frac{1}{2}$$

$$y - (-7) = -\frac{1}{2}(x - 4)$$

$$y + 7 = -\frac{1}{2}(x - 4)$$

4. Given a line containing the points $(5,7)$ and $(5,10)$. Find the equation of the line in slope-intercept form.

Since both x values are 5, the equation is $x = 5$

5. Given a line containing the points $(-4,1)$ and $(3,1)$. Find an equation of the line.

Since both y values are 1, the equation is $y = 1$

6. Convert the equation $2x - 3y = 9$ to slope-intercept form.

$$\begin{aligned} 2x - 3y &= 9 \\ -3y &= -2x + 9 \\ y &= \frac{-2x}{-3} + \frac{9}{-3} \end{aligned}$$

$$y = \frac{2}{3}x - 3$$

7. Convert the equation $4x + 5y = 20$ to slope-intercept form.

$$\begin{aligned} 4x + 5y &= 20 \\ 5y &= -4x + 20 \end{aligned}$$

$$y = \frac{-4}{5}x + 4$$

8. The two given equations represent lines. Are the lines parallel or Perpendicular or

neither? Explain briefly why. $y = 3x - 7$ & $y = \frac{-1}{3}x - 1$

The slopes $m_1 = 3$ and $m_2 = \frac{-1}{3}$ are opposite reciprocals.
The lines are perpendicular.

9. The two given equations represent lines. Are the lines parallel or Perpendicular or

neither? Explain briefly why. $y = \frac{-2}{3}x + 1$ & $y = \frac{2}{3}x - 4$

The slopes are not the same and not opposite reciprocals.
The lines are neither.

10. The two given equations represent lines. Are the lines parallel or Perpendicular or

neither? Explain briefly why. $y = \frac{4}{3}x - 3$ & $y = \frac{4}{3}x - 3$

The slopes are the same.
The lines are parallel.

11. The two given equations represent lines. Are the lines parallel or Perpendicular or neither? Explain briefly why. $3x - 2y = 2$ & $2y - 3x = 6$

$$\begin{aligned} 3x - 2y &= 2 \\ -2y &= -3x + 2 \\ y &= \frac{3}{2}x - 1 \end{aligned}$$

$$\begin{aligned} 2y - 3x &= 6 \\ 2y &= 3x + 6 \\ y &= \frac{3}{2}x + 3 \end{aligned}$$

The slopes are equivalent.
The lines are parallel.

12. The two given equations represent lines. Are the lines parallel or Perpendicular or neither? Explain briefly why. $2x - 5y = 15$ & $5x + 2y = 14$

$$\begin{aligned} 2x - 5y &= 15 \\ -5y &= -2x + 15 \\ y &= \frac{2}{5}x - 3 \end{aligned}$$

$$\begin{aligned} 5x + 2y &= 14 \\ 2y &= -5x + 14 \\ y &= -\frac{5}{2}x + 7 \end{aligned}$$

The slopes are negative reciprocals.
The lines are perpendicular

13. Line A has equation $y = 3x + 1$. Line B contains the point $(-1, 5)$ and is parallel to line A. Determine an equation for line B.

line B has slope $m = 3$

$$\begin{aligned} y - 5 &= 3(x - (-1)) \\ y - 5 &= 3(x + 1) \end{aligned}$$

14. Line A has equation $y = \frac{5}{2}x + 6$. Line B contains the point $(10, -8)$ and is perpendicular to line A. Determine an equation for line B.

Line B has slope $m = -\frac{2}{5}$

$$\begin{aligned} y - (-8) &= -\frac{2}{5}(x - 10) \\ y + 8 &= -\frac{2}{5}(x - 10) \end{aligned}$$

15. Write an equation of the line with slope $m = 3$ and y-intercept $b = -2$

$$y = 3x - 2$$

16. Write an equation of the line with point $(3, -11)$ and y-intercept $b = 1$

$$\begin{aligned} y &= mx + b \\ -11 &= m(3) + 1 \\ -12 &= 3m \\ -4 &= m \end{aligned}$$

$$y = -4x + 1$$

17. Write an equation of the line with point $(-6, -9)$ and slope $m = \frac{7}{3}$

$$\begin{aligned} y &= mx + b \\ -9 &= \frac{7}{3}(-6) + b \\ -9 &= -14 + b \\ 5 &= b \end{aligned}$$

$$y = \frac{7}{3}x + 5$$